Evaluating MoE and its Uncertainty and Variability for Food Contaminants

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Margin of Exposure (MoE), is a metric for quantifying the relationship between exposure and hazard. Ideally, it is the ratio of the dose associated with hazard and an estimate of exposure. For example, hazard may be characterized by a benchmark dose (BMD), and, for food contaminants, exposure by a measure of ingested chemical in the same units (say, mg/kg/day). Generally, both measures are uncertain, and may vary based on lifestyle and differ between children and adults. Use of BMD rather than NOAELs or T25 to characterize hazard is more appropriate when computing the MoE because the BMD is well-defined, can be efficiently calculated from typical bioassay data, and statistical methods for characterizing its uncertainty are relatively mature. However, for most chemicals there is substantially greater uncertainty in the denominator of the MoE. Available modeling approaches show promise, but often require substantial effort to parameterize. One challenge to the MoE approach is the limited availability of empirical hazard data for most chemicals. Promising new technologies are being developed to solve this data gap. This includes the US EPA's ExpoCast program which enables prediction of exposure estimates for thousands of chemicals based on use and production. In addition, reverse toxicokinetics (rTK) and *in vitro* to *in vivo* predictive models are connecting *in vitro* hazard concentrations to daily exposure estimates. New models and methods like these show great promise in reducing uncertainties in risk estimates for data poor chemcials. *This abstract does not necessarily reflect U.S. EPA policy.*